
# Intel Case Study

# (How Intel Implemented RosettaNet)

**Version: 1.0**

**28 September 2001**

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# Version History

| | | |
|---|---|---|
| Version 0.1 | 16 August 2001 | Jackson He drafted based on input from Jay Hahn-steichen |
| Version 0.2 | 05 September, 2001 | Jay Hahn-Steichen added more details based on the first draft |
| Version 0.3 | 19 September, 2001 | Jackson He and Colin Hulme made changes to make the case study product neutral. |
| Version 1.0 | 28 September 2001 | Final version |

# Preface

## Purpose of the Document

This document uses the case of the Intel implementation of RosettaNet to demonstrate how the B2B Conceptual Model could be used to analyze a current B2B solution. It shows the relevance of the model with regard to a real-world implementation. It also shows what works today in sections of the model, while many other pieces are still missing and less defined.

## Intended Audience

e-Business architects and business managers who are responsible for strategy and implementing B2B solutions; B2B standard bodies (W3C, OASIS, OAGI, etc.); B2B vendors and solution providers; and members of other BIC workgroups.

## Prerequisites

Readers of this document should have read*: High-Level Conceptual Model for B2B Integration* and *RosettaNet Case Study* document.

## Scope of the Document

High-level architecture discussion, does not contain implementation details.

## Structure of This Document

Follows the layers described in the High-Level B2B Conceptual Model.

## Acknowledgements

Many thanks to Jay Hahn-steichen and the Intel Enterprise Business Computing Engineering and Architecture Team for generously providing input.

# 1 Architecture Conceptual Model

Figure 1 is a conceptual B2B model. A detailed description of this model is available in a separate document (*High Level Conceptual Model for B2B Integration*). This model sets the context for the discussion of this case study.

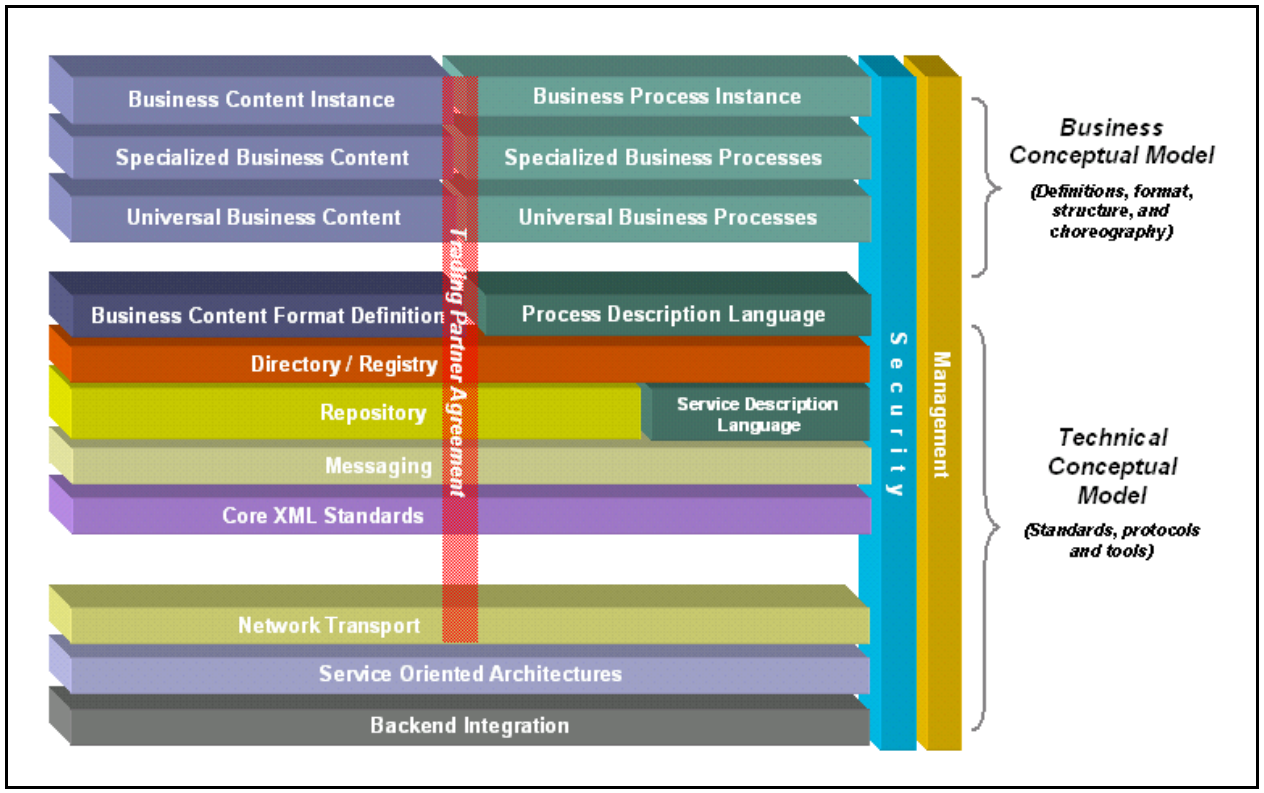


**Figure 1. B2B Integration Conceptual Model**

**Note: Please read the Conceptual Model document for descriptions of each layer and the RosettaNet case study document before proceeding with the following sections.**

# 2 Architecture Layers – Current Implementation

This section references the conceptual model described in Figure 1 and is based on the current implementation at Intel. The following subsections describe each layer of instantiation from the bottom to the top and from left to right. Most of the implementation follows RosettaNet specifications. The backend integration was customized to fit the implementation

Figure 2 is the implementation architecture of RosettaNet at Intel. Intel used a third party product as the "RosettaNet Engine" to implement RosettaNet protocols for B2B automation. Intel also employed a set of tools from EAI (Enterprise Application Integration) vendors, which include a common Messaging Bus, Message Routers, and Process Flow Translation and Coordination Engines.

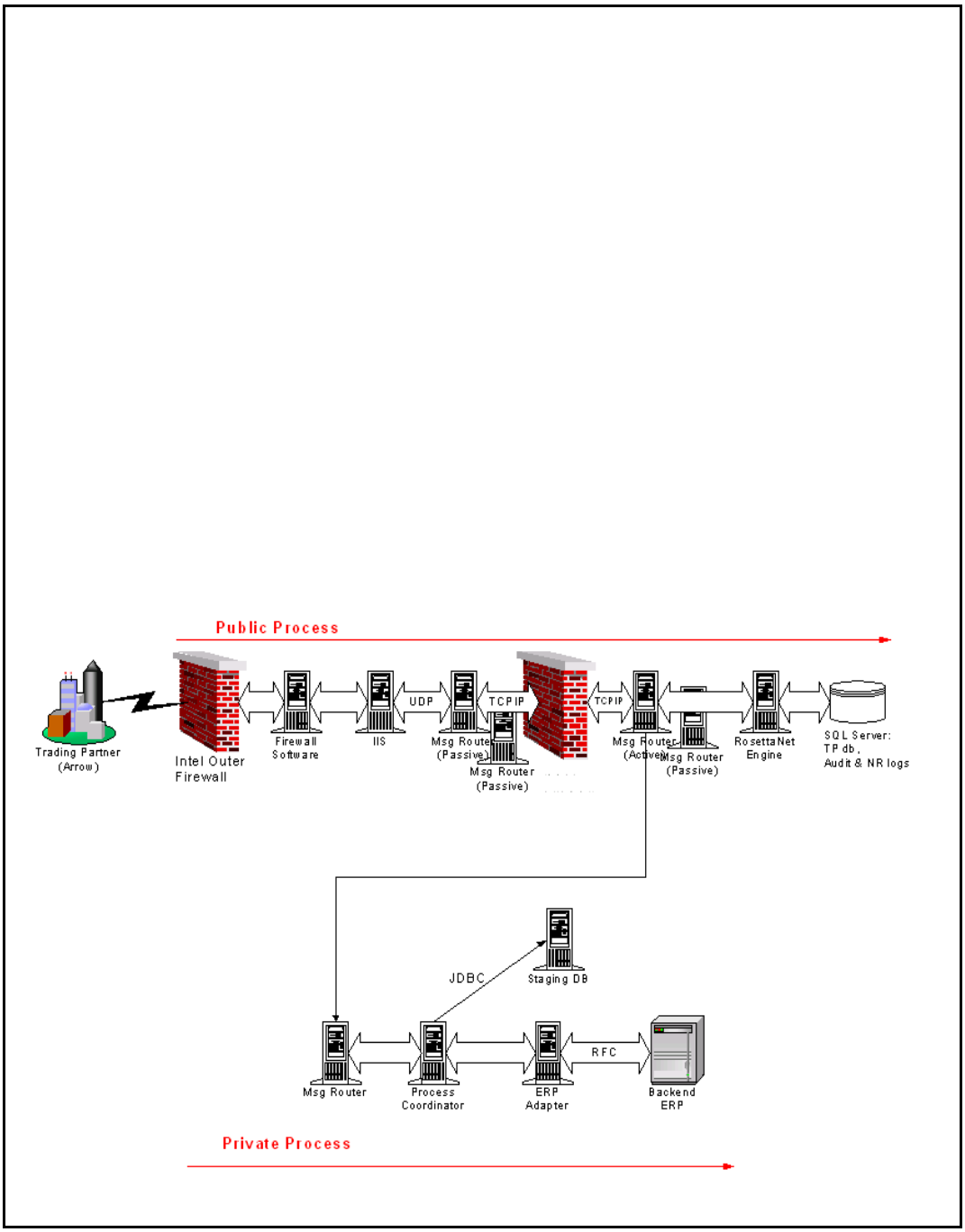


**Figure 2. Deployed Architecture of RosettaNet at Intel**

## 2.1 Backend Integration

Because RosettaNet does not have a specification for the backend (aka “private”) integration portion of B2B automation (out of the scope for RosettaNet core functionality), Intel designed the private process architecture based on its current EAI

infrastructure, which includes a common Messaging Bus, Message Routers, and Process Flow Translation and Coordination Engines (Process Coordinator).

An EPR Adapter is used to connect with Intel's Backend ERP systems. This adapter enables the coding and execution of IDOCs to handle data presentation to ERP and ERP data extraction. Data is moved through this adapter to the messaging bus.

Process Coordinator in the EAI systems holds processing and business logic in an XML model. State information is retained in a staging SQL database. Trading Partner data, required by private processing, has been kept in this SQL database. The process translation and coordination engines also handle data processing to and from the ERP system. They provide mechanisms for ensuring accurate data delivery, even in the event of downtime in one of the components.

A Process Coordinator also manages the flow of data to and from the gateway where "public" processing is done. Intel developed code on the engine to translate data from SAP into RosettaNet service content format then writes it to the Messaging Bus. Associated with this data are several name value pairs, which complete the information needed by the RosettaNet Engine to build the full RosettaNet object and to initiate delivery. The RosettaNet Engine provides the Process Coordinator with data received from a trading partner, and presents specific parts of this data in name value pairs making critical process-determining information available before XML parsing is done.

## 2.2 Service-oriented Architecture

The third party RosettaNet Engine product used by Intel is Java based. JDBC is used for connections with databases. The common Messaging Bus is used for communications between all pieces of the implementation.

## 2.3 Network Transport

Follows RNIF1.1 and RNIF 2.0 recommendations on SSL and HTTPS for message transport on the public process side. The only variances from these recommendations are: Intel does not currently perform client authentication in the transport layer.

Intel has also implemented connections to large parts of much of its supplier community using single-action RosettaNet PIPs sent via, an eFTP solution from another third party vendor.

The private process is also going over Intel's IP network using the Messaging Bus. Communication between remote servers on the Messaging Bus is enabled (or restricted) by the Messaging Router. There is another piece of third party software that converts local UDP data traffic to TCP/IP for WAN delivery, then back to UDP for the application server on the remote LAN segment to pick up.

Data inbound from a TP (Trading Partner) sent over HTTP/S is repackaged in the DMZ and delivered to the Messaging Bus.

For communication with locations where HTTP/S is unreliable, Intel has promoted use of an eFTP solution. Our tool of choice maintains a high level of security during transmission, uses the Internet infrastructure and common Internet settings, and is easily implemented. It has the drawback of supporting only simple document exchanges, is not integrated into more complex process orchestrations, and is not ubiquitous.

## 2.4 Core XML Standards

Intel constrains XML interchanges to DTDs provided by RosettaNet organization. These DTDs, and updates, are integrated into the RosettaNet Engine product.

## 2.5 Messaging Services

Based on the vendor implementation of RNIF 1.1 and RNIF 2.0, which is based on a proprietary messaging protocol by the vendor. Internally message reliability and re-usability (by multiple private processes for example) is provided based on the messaging protocol. Intel has worked with the vendor to define the RosettaNet Engine enhancements especially in the area of data re-usability and scalability to handle message volumes.

Internally messages are represented in either XML. To some extent, this can be modified to suit the needs of the application end-points. Externally, all data adheres to strict RosettaNet XML definitions.

## 2.6 Dictionary and Repository

Data used for PIP processing and PIP documents is retained in the TIB Repository. This is a proprietary datastore based on SQL Server from the vendor which maintains and manages data in XML format for its product suite. This datastore manages everything from business logic code, to RosettaNet DTDs, to TP data.

## 2.7 Directory Services

Not implemented.

## 2.8 Business Content Format Definition

Follow RosettaNet Business and Technical Dictionary definition.

Intel strongly supports the use of commonly defined business processes documents. We have current implementations of 3A4, 3A8, 3A9, 3B2, 3C3, and 3C4 without modification. There are roughly 10 additional PIPs coming online in the next 2 quarters.

## 2.9 Universal Business Content

Follow RosettaNet PIP specifications.

## 2.10 Specialized Business Content

Follow RosettaNet PIP specifications.

Under the constraints of short time to implementation and long lead times to adoption of new PIPs, Intel has defined a series of special processes used with a limited set of trading partners. Our hope is to be able to shortly move the requirements of these processes into the standard PIP set.

## 2.11 Business Content Instance

A PO from Arrow to Intel.

## 2.12 Service Description

Not applicable since it is not part of RosettaNet

## 2.13 Process Description

Follows RosettaNet and currently uses UML and natural language (in Word document) to describe business processes.

Intel has spent considerable time defining our expectations of PIP processes. We have captured these in a variety of formats and use these to measure the completeness and accuracy of the gateway products we evaluate and implement. These are pictorial and descriptive in natural language.

## 2.14 Business Processes (Universal and Specialized)

Intel uses RosettaNet org defined PIPs and tools that support this standard.

In some cases, where the RosettaNet org PIP has not yet addresses a special concern (e.g. unreliable HTTP/S connections) Intel has worked outside the RosettaNet specification. Intel remains committed to influencing the RosettaNet.org to include these requirements in future framework specifications

## 2.15 Business Process Instance

PO processing procedure and chorography to handle PO from Arrow.

At this point, Intel is executing PIPs as defined by RosettaNet. It is in Intel's interest to see these develop beyond today's point to point executions, to complex multiparty/multi-state processes which cross traditional company boundaries.

## 2.16 Trading Partner Profiles and Agreement

Following RosettaNet specifications.

The operational aspects of agreements with trading partners are recorded in our Trading Partner Database. There are other aspects of the agreement, which are handled via e-mail, and, in most cases, reviewed and maintained by our legal department.

## 2.17 Security

Inter-company Transport Security

Intel's implementation leverages the DMZ and firewall of the general e-Business environment to protect the servers. In addition, the Messaging Router inside the firewall is set to "passive" mode. It can only pass packages across the inner-firewall of the DMZ by pulling from the intranet side. This will reduce the danger of malicious attack spill from DMZ to the intranet.

By use of public SSL keys, Intel guarantees the identity of the web server a trading partner is delivering to.

Payload Security

Authentication

Intel requires trading partners to provide digital signatures with the payload. This data, and the stated DUNS number of the originator, are compared with the public key of the claimed originator. By this means we authenticate the document's point of origin.

When we engage in a TP agreement, Intel assigns special meaning to the Digital Signature on the document. This is the final mark of request authenticity and is taken to mean Intel may take action based on the contents of the document.

Authorization

Once authenticated, a check is made to ensure this TP is a known participant in the trading process they have initiated.

Intel has identified several areas where additional security can be implemented immediately, should there be an internal requirement, or should a problem need to be addressed from outside.

Physical Security

Intel demonstrates a commitment to keeping trading partner data confidential and secure by restricting internal physical access to servers used in RosettaNet processing.

## 2.18 Management

Infrastructure

Leverage to existing server monitoring and performance tuning tools at the e-Business Data Center. We also added a monitoring tool to monitor the RosettaNet Engine and Process Coordinator.

The entire infrastructure is designed for fault tolerance to ensure 24x7 operation. There is redundancy throughout the gateway implementation and an assured power supply. There are still a few single points of failure in the back-end infrastructure. Where these exist, there are processes in place to minimize outages and to keep them from affecting trading partner exchanges.

Trading Partner

Certificate interchanges and maintenance are handled manually.

Trading partner agreements are handled manually.

Initial trading partner testing is done manually.

When a trading partner wants to add pips they must go through a series of tests to validate these can be handled successfully end to end.

Processing

Problems identified in processing (error states, discrepancies, etc.) must be analyzed and sometimes must be worked out with trading partners.

# 3 Some considerations for future RosettaNet Implementation

Focus on DMZ implementations.

Focus on secure DMZ implementations. Perhaps provide a model for how this should be done.

Focus on integrating PIP processing with other commonly available non-HTTP transports (e-FTP, SMTP, store and forward)

Define standards for integration with hub services.

Define integration with evolving security standards (PKI).

Define legal meaning of digital signature.

Focus on the private process – e.g. get SAP to use RosettaNet XML format for external data representation improve ease of integration with private processing

Automate the TP agreement stage, based on common legal understandings of what it means to engage in the process.

Automate the management of Public Keys (see PKI above).

Promote the use of RosettaNet in small and medium sized enterprises

- Must ease backend integration ramp time
- Must ease transport security concern

# APPENDIX A REFERENCES


- *Understanding a PIP Blueprint*. RosettaNet, 1999, 2000. (Source: http://www.rosettanet.org)
- *RosettaNet Technical Conventions and Style Guide.* RosettaNet, 2000. (Source: http://www.rosettanet.org)
- RosettaNet PIP Specifications (complete collection). RosettaNet, 1998-ongoing. (Source: http://www.rosettanet.org)
- RosettaNet Dictionaries (business, technical). RosettaNet, 1998-ongoing. (Source: http://www.rosettanet.org)

# APPENDIX B GLOSSARY